

IN THE CLAIMS:

1-3. (Canceled)

4. (Original) A method of fabricating a semiconductor device comprising:

forming a structure comprising a p-well and an n-well formed on a surface of a semiconductor substrate, an n-type source and an n-type drain formed on the surface of the semiconductor substrate and configured to sandwich a channel region on a n-type MIS transistor formed at the p-well, an insulation film having openings, at bottom of which the p-well and the n-well are exposed, the n-type source and n-type drain formed on the p-well and configured to sandwich the associated opening, and a p-type source and a p-type drain formed on the n-well and configured to sandwich the associated opening;

forming a gate insulation film on the p-well and the n-well exposed at the bottoms of the openings;

forming a first metal-containing film on the p-well and the n-well exposed at the bottoms of the openings, the first metal-containing film having a Fermi level on a conductive band side from a substantial center of a band gap of the semiconductor substrate;

removing the first metal-containing film on the n-well;

forming a conductive coating film on the first metal-containing film and on the gate insulation film formed on the n-well, the conductive coating film having a Fermi level on a valence band side from a substantial center of the band gap of the semiconductor substrate; and

forming a second metal-containing film on the conductive coating film, the second metal-containing film having a lower resistance than the first metal-containing film and the conductive coating film, thus filling the openings.

5. (Original) A method according to claim 4, wherein the formation of the conductive coating film including:

a step of forming an insulative coating film with a substantially flat surface on the first metal-containing film on the p-well and on the gate insulation film on the n-well, thus filling the openings;

a step of selectively etching the coating film and exposing the openings once again while leaving the coating film; and

a step of subjecting the coating film to a predetermined process, thereby making the coating film electrically conductive.

6. (Original) A method according to claim 5, wherein said coating film is formed of an organic material containing carbon, and

said predetermined process subjects the coating film to heat treatment, laser anneal or electron radiation.

7. (Original) A method according to claim 5, wherein said coating film is formed of an organic material having benzene rings serially connected, and iodine is introduced in the coating film in said predetermined process.

8. (Original) A method according to claim 4, wherein the formation of the conductive coating film including:

a step of forming a conductive coating film with a substantially flat surface on the first metal-containing film on the p-well and on the gate insulation film on the n-well, thus filling the openings;

a step of selectively etching the coating film and exposing the openings once again while leaving the conductive coating film.